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Electo Electro 2020, an Interactive Voting Booth Installation

MIKE RICHISON¹

Abstract

Electo Electro 2020 was a project that was created specifically for the 2020 presidential election cycle. This paper is a follow-up to an article published in 2019 for the *Journal of Network Music and Arts*, “Voting Booths and Interactive Art Installations: The Diebold AccuVote-TS in Context.” In that paper, I discussed the original concept and goals for the project, several examples of work from other artists, and an earlier project from 2016 that served as the impetus for *Electo Electro*. This paper will discuss the outcomes and iterations of the project, specifically how it was adapted to an online format. It will also delve into specific design and technical decisions regarding the interface, branding and collateral materials, and the networked aspect of the project. There have been recent developments concerning the debate surrounding voting technology and security which will be discussed as well.

Introduction

During the 2020 presidential election cycle in the United States, I worked on a project called *Electo Electro 2020*. This project featured iMacs embedded in eight decommissioned Diebold AccuVote-TS voting booths. The project was originally conceived as an interactive installation that would enable participants to produce techno-inspired beats using video clips of the current presidential candidates. Due to the Covid-19 health crisis, the project was installed in a locked gallery that was closed to the public (figs. 1, 2, 3). Performances of the project occurred nightly on Twitch during October 2020, leading up to the night of Election Day, November 3, 2020 (figs. 4, 5).

This project combined iMacs, iPads, a custom software patch, and the housing from decommissioned, defunct, and disgraced Diebold AccuVote-TS voting booths in order to make it possible for voters to remix videos from political rallies, debates, and news in a structured sixteen-beat loop. The iPad-based touchscreen design was a parody of the voting system employed by the

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AccuVote-TS, which proved difficult to audit and susceptible to hacking. The parody continued into the format of the installation itself: it resembled a real polling station. The stations featured a vocoder, a drum machine styled after the Roland TR-808 Rhythm Composer, a simple video-clip editor, various audio effects and controls, and an extensive library of video clips to choose from. The branding and graphic elements of the project hearkened back to vintage electronic devices and dusty beige computers with clunky monitors displaying acidic blue error screens.

The Diebold AccuVote-TS debuted in the early 2000s as the culmination of efforts stemming from the Help America Vote Act.² After its widespread adoption, a group of computer scientists at Princeton University discovered a long list of vulnerabilities in the AccuVote-TS, including several hardware and software entry points resulting in opportunities to steal votes, lose votes, or render the machine itself unusable.³ Despite these issues, this system was used as recently as 2018 in Georgia during its gubernatorial election (fig. 6).⁴

The original concept for *Electo Electro 2020* called for an open-format installation where people could enter the art gallery, locate a station, and interact with it—similar to the actual voting process. To adapt to the safety concerns surrounding the pandemic, the installation was closed to the public, and demonstrations and performances of the piece occurred virtually only. The content of the project was continually updated with footage from debates, rallies, and news interviews. Audio from the stream was edited, mixed, and regularly uploaded to the project's SoundCloud account.

Previous Work

The structure of *Electo Electro 2020* stemmed from the 2016 project *Video Voto Matic* (figs. 7, 8). The physical interface of *Video Voto Matic* included a custom-made “butterfly” ballot which mimicked the notorious Votomatic voting machines that garnered international attention during the 2000 presidential election. A paper ballot was inserted into the *Video Voto Matic* device. Like the real Votomatic, participants used a stylus to punch holes through a voting booklet into their ballot. The booklet provided sample drum tablatures which helped them create a beat from short video

² M.R. Kropko, “Diebold Weighs Strategy for Voting Unit,” WIRED, Associated Press, March 9, 2007, https://web.archive.org/web/20070309174255/http://hosted.ap.org/dynamic/stories/D/DIEBOLD_VOTING?SITE=WIRE&SECTION=HOME&TEMPLATE=DEFAULT.

³ Ariel J. Feldman, Alex Halderman, and Edward W. Felten, “Security Analysis of the Diebold AccuVote-TS Voting Machine,” in *EVT '07: Proceedings of the USENIX Workshop on Accurate Electronic Voting Technology* (Berkeley, CA: USENIX Association, 2006), 2, <https://doi.org/10.5555/1323111.1323113>.

⁴ Kim Zetter, “One Little-Watched Race Has Huge Implications for Election Hacking and Voter Suppression in Georgia,” *The Intercept*, November 13, 2018, <https://theintercept.com/2018/11/13/georgia-secretary-of-state-voter-suppression/>.

clips stored on a computer. The resulting track was fed to speakers and a video monitor. At the end of their session, participants pulled out their ballots and dusted off the hanging chads.⁵

The Diebold AccuVote-TS and Voting Security

The choice of the AccuVote-TS was intentional due to the fact that it has been a central point of conversations about problems within the U.S. electoral system. Within the project, the Diebold AccuVote-TS booth serves a dual role, both as found object and as packaging. The voting booth housing both figuratively and literally encases its functional components (iMac, custom software, iPad) in a non-functioning—or perhaps dysfunctional—skin or membrane. It is difficult to see or encounter this covering without thinking about or referring to the vulnerabilities, failures, and controversies that surround the AccuVote-TS system. The presence of the Diebold AccuVote machine en masse points to this and reinforces it while also referencing the conspiracy theories that are in the news in the present day.

The Diebold AccuVote-TS system is an example of a direct-recording electronic (DRE) voting system. These systems keep track of votes digitally on a hard drive and did not print their records on a paper roll as a backup.⁶ As previously mentioned in this essay, in 2003, researchers discovered a long list of vulnerabilities in the AccuVote-TS system, including several hardware and software entry points resulting in opportunities to steal votes, lose votes, or render the machine itself unusable.⁷ The Diebold AccuVote-TS system embodied a breakdown of the democratic process. It had no built-in auditing via paper. The computer used code owned by its parent company that could not be checked or audited. State-level voter databases associated with this voting system have seen serious security breaches. Its manufacturer has been embroiled in scandals including questionable affiliations between political officials and corporate executives.⁸ Despite all these issues, this system was used just over two years ago in Georgia during its 2018 gubernatorial election.⁹ That election, however, marked the last year that Georgia would employ the Diebold system, and it was replaced by Dominion Voting Systems for the 2020 general election.¹⁰ Twenty-

⁵ For a video of the project, see M. Richison, "Video Voto Matic (updated documentation)," uploaded October 9, 2016, YouTube video, 2:00, <https://www.youtube.com/watch?v=reiEx4DFDhA>.

⁶ Paul S. Herrnson et al., *Voting Technology: The Not-So-Simple Act of Casting a Ballot* (Washington, D.C.: Brookings Institution Press, 2008), 10.

⁷ Ariel J. Feldman, Alex Halderman, and Edward W. Felten, "Security Analysis of the Diebold AccuVote-TS Voting Machine," 2.

⁸ Common Cause, "Common Cause, the National Election Defense Coalition and Protect Democracy Support Legal Challenge to Georgia's Insecure Voting System," July 17, 2018, <https://www.commoncause.org/press-release/common-cause-the-national-election-defense-coalition-and-protect-democracy-support-legal-challenge-to-georgias-insecure-voting-system/>.

⁹ Kim Zetter, "One Little-Watched Race Has Huge Implications for Election Hacking and Voter Suppression in Georgia."

¹⁰ Mark Niesse, "New Georgia Voting Machines Win Final Vote in State House," *The Atlanta Journal Constitution*, March 14, 2019, <https://www.ajc.com/news/state--regional-govt--politics/new-georgia-voting-machines-win-final-vote->

eight other states also currently make use of Dominion voting stations, according to the company website.¹¹

Voting technology and security are topics that remain in the news, even after the results of the 2020 presidential election became clear. Uncorroborated claims of voter fraud are flowing from pundits and attorneys alike. In addition to unproven accounts of errors or cheating occurring with ballots and ballot counts, there have been several unsubstantiated statements about vulnerabilities and flaws within the Dominion system.¹² I will focus primarily on those centered around voting technology.

Former attorney for the Trump campaign Sidney Powell and personal attorney for President Trump Rudy Giuliani made many of these outlandish claims in a press conference held on November 19, 2020. Powell attempted to build a completely unfounded narrative that attempted to link Dominion Voting Systems to the deceased Venezuelan dictator Hugo Chavez, the Clinton Foundation, and George Soros. She has also claimed that the software had many “back doors” such as thumb drive ports and an internet connection that allowed for votes to be flipped from one candidate to another. Powell went on to state that a study from Princeton University substantiated her claims that there remains a method to change votes through the software running on the Dominion machines.¹³

Powell has yet to provide any sort of evidence of actual hacking, breached security, or fraud. Fox News commentator Tucker Carlson has even extended an open invitation to speak about such topics on his program, which Powell has repeatedly declined.¹⁴ Stating a system’s potential vulnerabilities may be cause for concern but it does not constitute evidence of the failure of that system according to a statement signed by 59 scientists and researchers who have worked in the field of election security, including Andrew W. Appel whose findings were taken out of context by Powell.¹⁵ The Princeton Dominion study cited by Powell in reality did not utilize the same Dominion machines employed by Georgia for the 2020 presidential election, but rather an older

state-house/twQCxrn1Cy9bFbLcUEwTlN/; Mark Niese, “Georgia Awards Contract for New Election System,” *The Atlanta Journal-Constitution*, July 30, 2019, <https://www.ajc.com/news/state--regional-govt--politics/georgia-awards-contract-for-new-election-system-dominion-voting/tHh3V8KZnZivJoVzZRLO4O/>.

¹¹ “About,” Dominion Voting Systems, accessed January 17, 2021, <https://www.dominionvoting.com/about/>.

¹² Rudy Giuliani and Sidney Powell, “‘TRUMP WILL WIN’ Rudy Giuliani Says LEGAL CHALLENGES WILL PREVAIL,” NewsNOW from Fox, YouTube video, November 19, 2020, 51:20, <https://www.youtube.com/watch?v=akqeL9AtJYI&t=2339s>.

¹³ For the research paper cited by Powell in making a civil case for election fraud in Georgia, see Andrew W. Appel, Richard A. DeMillo, and Philip B. Stark, “Ballot-Marking Devices Cannot Ensure the Will of the Voters,” *Election Law Journal: Rules, Politics, and Policy* 19, no. 3 (September 2020): 432–450, <https://doi.org/10.1089/elj.2019.0619>.

¹⁴ David Bauder, “Dominion Worker Sues Trump Campaign and Conservative Media,” Associated Press, December 22, 2020, <https://apnews.com/article/election-2020-joe-biden-donald-trump-colorado-media-537ef789db98c14dcd4699c9-f386a7b2>.

¹⁵ Tony Adams et al., “Scientists Say No Credible Evidence of Computer Fraud in the 2020 Election Outcome, But Policymakers Must Work With Experts to Improve Confidence,” November 16, 2020, <https://www.mattblaze.org/papers/election2020.pdf>.

Dominion model used in New Jersey.¹⁶ Furthermore, the newest Dominion systems employ a paper backup system. This paper backup was used in one of the recounts in Georgia following the 2020 general election.¹⁷

Dominion Voting Systems has taken action in the form of a letter to Sidney Powell and various outlets such as the Rush Limbaugh Show, Fox News, and Newsmax demanding retractions.¹⁸ In response to Dominion Voting Systems' letter, Fox News and Newsmax have issued statements that declared that no voting corporation or software has engaged in corrupt activities.¹⁹ Since that letter, Dominion has taken things a step further with Powell by naming her in a \$1.3 billion defamation lawsuit.²⁰

Although Powell's claims are unsubstantiated and there is no credible evidence of fraud or hacking, there remains a need to monitor election security and keep equipment up to date. As stated in the previously mentioned letter from the 59 voting security experts, "it is imperative that the U.S. continue working to bolster the security of elections against sophisticated adversaries."²¹ An article published in *USA TODAY* on Election Day 2020 draws a parallel between voting on an aging voting machine and using a laptop from the 1990s. The article calls for a return to paper voting which it calls the "gold standard" because it is easier to audit. Also found in this piece were stories about how touch-screen voting on an old voting machine could prove to be unreliable. In these cases, it is not fraud impeding democracy, but rather outdated and potentially damaged equipment.²²

Another security issue that is found in many voting machines is the use of a modem. In an *NBC News* article, Appel was quoted as saying that a voting computer or vote-counting machine that has a built-in modem that has a network connection compromises its security. He calls them a

¹⁶ Sandeep Mangat, "Cited in Election Lawsuit, Princeton Professor Andrew Appel '81 Says Ex-Trump Attorney's Claims Have Little Merit," *The Daily Princetonian*, December 1, 2020, <https://www.dailyprincetonian.com/article/2020/12/princeton-professor-referenced-georgia-lawsuit-ex-trump-campaign-attorney-sidney-powell-andrew-appel>.

¹⁷ Dominion Voting Systems, "Setting the Record Straight: Facts & Rumors," accessed January 17, 2021, <https://www.dominionvoting.com/election2020-setting-the-record-straight/>.

¹⁸ Jacob Shamsian, "Dominion Threatens Defamation Lawsuit for Sidney Powell's Election Conspiracy Theories: 'You Are Not Entitled to Your Own Facts,'" *Business Insider*, December 17, 2020, <https://www.businessinsider.com/dominion-voting-threatens-sidney-powell-with-defamation-lawsuit-2020-12>.

¹⁹ Shayan Sardarizadeh, "U.S. Election 2020: Fox News, Newsmax Walk Back Voter Fraud Claims After Legal Threat," *BBC News*, December 23, 2020, <https://www.bbc.com/news/world-us-canada-55413932>.

²⁰ Erik Larson, "Sidney Powell Sued by Dominion for \$1.3 Billion Over Vote-Fraud Claims," *Bloomberg*, January 8, 2021, <https://www.bloomberg.com/news/articles/2021-01-08/sidney-powell-sued-by-dominion-voting-over-election-fraud-claims>.

²¹ Tony Adams et al., "Scientists Say No Credible Evidence of Computer Fraud in the 2020 Election Outcome," November 16, 2020, <https://www.matthblaze.org/papers/election2020.pdf>.

²² Pat Beall, "Will Your Ballot Be Safe? Computer Experts Sound Warnings on America's Voting Machines," *USA TODAY*, November 2, 2020, <https://www.usatoday.com/story/news/investigations/2020/11/02/computer-experts-sound-warnings-safety-americas-voting-machines/6087174002/>.

“bad idea.”²³ The larger point that can be made is that in the midst of the chaos being sowed by the likes of Powell and Giuliani, vigilance is important, and just because a hack has not occurred does not mean our voting system is immune to such attacks.

The Interface and Functionality

Electo Electro 2020 runs within the Max/MSP/Jitter programming environment on each iMac. This environment can handle the video content as well as provide a framework to build a unique touchscreen-based user interface. Cycling 74, the distributor of Max/MSP/Jitter, also distributes a companion app called Mira that allows for a custom interface that operates on an iPad. The touchscreen is important to the concept of the piece, as it serves to refer to the original touchscreen interface of the Diebold AccuVote-TS.

Like the *Video Voto Matic* predecessor, *Electo Electro 2020* uses video clips that sample parts of words in order to build percussion tracks, resulting in a breakdown of language. The departure from the earlier *Video Voto Matic* lies in the touchscreen interface and many additional features, including a networked tempo option which enables multiple stations to share a single tempo, operating essentially as one large instrument.

iPad Control Panels 1 and 2: Steps 1–16 (Pattern A) and 17–32 (Pattern B)

The four iPad control panels of the current version of *Electo Electro 2020* each have a specific function. The first panel contains a 16-step sequencer that is broken down into eight separate horizontal layers. Each represents a different percussive sound such as a kick drum, high hat, or snare. These sounds from the videos mimic the percussive sounds typically found in a drum machine such as a Roland TR-808, thus resulting in a video beatbox. The sounds come from very short videos of presidential candidates articulating the percussive sounds. The source material is news footage taken from YouTube (figs. 9, 10).

The user can program a pattern by tapping on small boxes, each representing a “step” in a sequence. The 16 steps refer to 16th notes in 4/4 time. The beat is counted off by a moving red line. There is a volume control for each track. The user can also increase or decrease the tempo. There is also a method to build a 4-measure or 64-step pattern on the first panel. Users can choose how often the measure plays in a four-measure pattern or loop. The four-measure loop is also counted

²³ Kevin Monahan, Cynthia McFadden, and Didi Martinez, “‘Online and Vulnerable’: Experts Find Nearly Three Dozen U.S. Voting Systems Connected to Internet,” *NBC News*, January 10, 2020, <https://www.nbcnews.com/politics/elections/online-vulnerable-experts-find-nearly-three-dozen-u-s-voting-n1112436>.

off with a moving red light. The boxes and organizational elements resemble similar components found on touch screen voting booth machines.

Users can choose between sets of candidate videos by scrolling through potential selections in a dialog box and hitting the “select” button. A small image of each candidate appears to help them out with the process.

The possibility exists that casual visitors may be completely overwhelmed by the number of options. A button labeled “hide extras” conceals many of the features for a more streamlined look. An experienced docent or demonstrator can activate this mode to clean up the appearance of panel 1. Panel 2 adds 16 more unique steps—another measure—to the pattern. Panel 1 (pattern A) and panel 2 (pattern B) can be programmed to play in several patterns: AAAA, BBBB, ABAB, or BABA.

iPad Control Panels 3 and 4: Trimming Clips, Adding Audio Effects, and Phrase Selection

The discussion of the functionality of panels 3 and 4 should begin with panel 4, the phrase selection panel (figs. 11, 12). Whereas panels 1 and 2 deal primarily with fragments of words, panel 4 facilitates the selection of a longer phrase. These samples can be woven into the audio track to build texture. The selection of specific phrases is organized by individual politician and context. The selection interface for panel 4 is separated by 8 smaller panels, each corresponding to the 8 layers or lines in panels 1 and 2. Each individual selection panel is comprised of two tiers. The first tier selects the individual politician and context, and the second selects the phrases themselves. For example, a group of phrases uttered by President Donald Trump in the early stages of the coronavirus pandemic can be found under the heading “Early Virus Remarks.” Specific phrases from that time period can be selected underneath.

Panel 3 provides an interface that trims the video clip and dials for effects such as reverb/delay, clip speed, and both high- and low-pass filters. A pulse corresponding to whole, half, quarter, eighth, or sixteenth notes can be added to the audio clip. This effect helps to rearticulate a sense of rhythm in longer video clips and phrases.

iPad Control Panels 5 and 6: Timed-Effect Controls and Vocoder Panel

The “effect graphs” panel applies timed effects to the volume, delay, clip speed, and low-pass dials. The pattern can be stretched over one, two, or four bars. Users can draw a pattern in the “effect graphs” editor or capture real-time manipulation with the volume dial (fig. 13).

In the vocoder panel, users can record a melody with the keyboard or shape a melody with the graph editors. This melody can be stretched over 1, 2, or 4 bars. Vocoder effects can be applied to longer phrases or short percussive patterns (fig. 14).

Updates and Evolution

The original plan for *Electo Electro 2020* called for the ability to create basslines, voice samples, and melodies. Initially, creating three different interfaces seemed to be the best solution for providing these options. Rather than constructing three different instruments, the answer was the vocoder panel which proved to be rather versatile. Users can add a synthesized melody to a phrase. When used in tandem with a delay and/or the low-pass filter, coherent verbal phrases can be abstracted, resulting in something that sounds more like a tone rather than spoken words. The timed-effects panel and its ability to “record” movements in the dials was also a late addition in the process.

Design Considerations

Several design cues were taken from the Roland TR-808 and TR-909, as well as products from the Korg Volca series. These pieces of audio equipment in particular influenced the display of the sequencer component of *Electo Electro 2020* is displayed. One of the goals of the overall layout is to remind users that the structure of the audio output is based on 4/4 time. Each row of the interface contains a dark gray box every fourth box to count off quarter notes.

In *Voting Technology: The Not-So-Simple Act of Casting a Ballot*, Paul Herrnstrom and his colleagues provide extensive documentation of ballot designs that utilize high contrast and heavy strokes between sections.²⁴ In the design of *Electo Electro 2020*, however, all panels tend to follow more along the lines of Edward R. Tufte’s call for low-contrast differentiations between the elements and an elimination of what he calls the “dominating grid.”²⁵ By removing the thick black lines normally found on paper and screen-based ballots, the design brings more attention to the boxes, buttons, and dials. The organizational colors were reduced in opacity and saturation in effort to bring visual attention to interactive elements.

The shape of the buttons and boxes give subtle clues to their function. Buttons that deal with rhythm tend to be squares or rectangles such as the 16-steps and the 4-measure pattern buttons, whereas buttons dealing selections or toggling features on and off tend to be round. There are, of

²⁴ Herrnstrom et. al., *Voting Technology: The Not-So-Simple Act of Casting a Ballot*, 22–36.

²⁵ Edward R. Tufte, *Envisioning Information*, Cheshire, CT: Graphics Press, 1990, 54–64.

course, exceptions to this. All dials are white and, depending on their function, can have black or gray needles.

The overall color scheme of each panel is unique. Panel 1 is primarily blue with red accents; panel 2 is primarily red with blue accents; panel 3 is yellow; and panel 4 is blue. This differentiation reinforces the different tasks assigned to each panel.

Accompanying the design of the interactive panels is a custom logo and branding. The bold typeface of the Electro Electro logo is a clear parody of the Diebold logo. The thick bold letters of the logo refer to the retro-futuristic agenda of logos such as the *Blade Runner* movie logo and production company Orion Pictures (fig. 17). This approach seemed to be appropriate given the age of the Diebold AccuVote-TS system: first introduced in 2002, it was 16 years old when last used in 2018. The logo appears on all interactive panels as well (figs. 9–14).

Networked/Collaborative Mode

Although voting is normally a rather solitary activity, the entire bank of voting stations is linked together to form a network that can share a common tempo. The option to share a tempo, sync the downbeat, and play collaboratively is activated by pressing the “share” button in the tempo control dialog box. In this mode, multiple participants can work together or a single performer can play several stations at once. Unfortunately, given the constraints imposed by the pandemic, having a group of people physically interacting with the project was not possible. A single performer, however, could make use of the entire installation as a single instrument. That occurred during the streamed Twitch performances.

The “share” button links an individual station with other stations that have also activated the button. There are essentially only two pieces of information sent over the ethernet network: downbeat and changes to tempo. The Max/MSP objects used to share this information are “udpsend” and “udpreceive.” Once the “share” button has been activated, the machines enter a primary and secondary role. The last machine to select the “share” button serves as the primary station. The primary station’s role is to broadcast the downbeat over the network. The secondary stations can only receive the downbeat. This ensures that all stations that have activated the “share” option will be in sync. Each station is responsible for maintaining its own tempo on its local metronome, which, in this case, is Max/MSP’s “global transport” object. Although there are primary and secondary roles regarding the downbeat, any machine can make changes to the tempo and all other machines will respond.

The IP address of all eight stations was hard-coded into a Max/MSP patch, and this patch was uploaded to each machine. There was a problem initially with a station potentially sending a signal to itself but a simple Max/MSP external ensures that a machine will not do this, avoiding a confusing “multiple downbeat” signal. At times during a performance, there were occasions where

signals between the machines would become confused or redundant. This was solved by hitting the “share” button multiple times or turning individual patches on and off during a performance to reset the beat.

Shift from Interactive Installation to Streamed Performance Format

Just as *Video Voto Matic* was installed in multiple locations ranging from busy sidewalks to art galleries, *Electo Electro* was originally conceived as an interactive installation open to the public. The best way to experience the project would have been to engage with it as a participant, thus mirroring the voting process. A visitor would walk into the installation, receive a brief set of instructions from a docent or attendant, then begin to engage with the interface. This would have been ideal. However, during summer 2020, it became clear that the pandemic would not allow for physical interaction and that the project would shift to an online-only presentation in the form of regularly streamed performances on Twitch. These took place every day at midnight and ran from October 2020 until the night of Election Day on November 2 (figs. 4, 5).

Before the audio/visual and streaming issues could be addressed, the physical components needed to be fabricated. The booths were modified by drilling and cutting holes for wires and increased visibility. Wooden components were designed and built to simulate the presence of the Diebold AccuVote-TS computer and touchscreen housing. After this work came the process of connecting the audio and setting up the cameras—essentially, turning the Ice House Gallery at Monmouth University into a small broadcast studio. Luckily, this space was available for the entire run of the project.

The audio from each iMac was connected into a mixer which then fed the audio into a laptop running OBS (Open Broadcaster Software) Studio, a free and open-source software program that facilitates connections to streaming platforms. The broadcast screen was split into three camera angles: a wide angle that framed all eight voting booth stations, a high angle from the right side of the installation, and a medium shot from the middle. Two webcams were used for the first two angles, and the built-in camera on the OBS Studio station laptop provided the medium shot. A night setting provided an opportunity to use projections. The video output from four stations was projected on the wall behind the stations, creating the effect of a light show while adding an extra layer of visual interest.

Most audio compositions came together rather quickly. The process began about an hour before the midnight broadcasts. I spent this short time before the start of the stream to experiment with the audio components to find phrases and melodies that could serve as the backbone for a beat. Compositions would typically start with a phrase having a cadence that would fit into a 4/4 time signature. Phrases were chosen according to recent events, if possible, e. g., video clips of the

most recent debate. I found that Donald Trump's repetitive method of speaking and use of short sentences and phrases fit very well into a metered structure.

Once a few phrases were chosen for the composition, the vocoder panel was used to add a melody. If appropriate, up to three other vocoder layers would be added to offset the initial main melody. The other four stations would be used to provide percussion. During the performances, I attempted to bring in vocal components by first allowing the listener to hear the original unfiltered soundbites. I would then add the vocoder effects, then distort them with a low-pass filter and delay effects in order to arrive at a distorted melody. The basic style of composition was meant to refer to a 4/4 minimal techno beat. During the performances, layers and effects were added and removed gradually and deliberately in order to let viewers watch the functioning of the interface as well as observe how the verbal phrases evolved—or devolved—into pure audio, which could be heavily distorted at times.

These shorter nightly performances (usually between 15 and 25 minutes in length) culminated in an extended hour-long set performed on the night of Election Day. This was sponsored and promoted by DJ, musician, and producer Darryl Montgomery-Hell and his organization s6k Media. One of my goals for the extended performance was to play everything live and to eliminate pre-programmed or pre-loaded patterns, beats, and phrases. During the nightly performances running up to Election Day, I would play a single composition and preload patterns, effects, and phrases into the interface before the project was streamed. This allowed for more complicated layering. On election night, however, the extended set was comprised of several shorter compositions. I had to make do with less layering on each section, and most sections had only one or two vocoder layers.

Another aspect that was missing from an online-only format was the chance to have informal discussions about the research and conceptual development behind the project. This would have been facilitated by participants' physical visits to and interactions with the installation. Many of my previous projects have made use of printed takeaways to help with explanation. For example, the ballot from *Video Voto Matic* was also a piece of branded collateral featuring information about the project that the participant could take home. For *Electo Electro*, this information needed to be available online. A website with extensive documentation, a detailed user's manual, a link to the earlier *JOMNA* article, links to social media for the project's SoundCloud and Twitch accounts, and an extended artist statement fulfilled this role (figs. 18, 19). In an effort to increase direct interaction and to respond to the increasing adoption of mail-in voting across the board, I designed an interactive ballot with percussive tablature that could be downloaded as a PDF and sent back. This composition was played and embellished during a performance (fig. 19). Unfortunately, this mail-in ballot was rather underutilized, as only one "voter" participated.

Obstacles and Challenges

This project marks the first time I played a streaming performance, as many of the projects I worked on previously took place as installations in physical sites. The use of speakers for these earlier projects, including *Video Voto Matic*, was rather rudimentary and did not involve a great deal of sound control. Because all audio for *Electo Electro* was being fed through a single output, there was a need to have more control over the audio. After trying 4 different mixers, I had the most success with a 24-channel USB mixer. Another issue was electrical feedback occurring in the audio. There were multiple sources for this: eight iMacs, three routers, four projectors, the laptop broadcast station, and old wiring in the gallery. This was eliminated by plugging all the iMacs into noise-canceling surge protectors.

Bunker Edition and Shelter in Place

Shortly after working together on the Election Day event, Darryl Montgomery-Hell and I started to plan an updated version of the performance that could happen in December. I had wanted to continue working on the project after the election, and this seemed like a good opportunity to deal with the glut of misinformation permeating the news. I was especially interested in how voting technology and security was again at the center of the conversation. Darryl and I had discussed our mutual admiration of German industrial band *Einstürzende Neubauten*, particularly their use of surprising materials such as rocks, sheet metal, springs, and other items as percussive instruments. The subject matter of the performance featured news conferences and footage that occurred after the election. Content was comprised of Joe Biden's Thanksgiving Day address; Rudy Giuliani, Sidney Powell, and Jenna Ellis's November press conference; Donald Trump's post-election press conferences; and Melissa Carone's testimony before a Michigan State House Panel (Carone was Giuliani's witness in the Michigan hearing).

Electo Electro: Bunker Edition was scaled down to four iMacs instead of eight, with two for vocoder and two for percussion. The voting booths were eliminated entirely. Each iMac would be controlled by two iPads, allowing access to two panels at a time, instead of just one. The percussive layers were very different as well. As an homage to *Einstürzende Neubauten*, I added percussion instrument sets made from videos featuring the mechanical sounds of voting booths and ballot-counting machines. Overall, the outcome allowed for experimentation in the form of a louder, more aggressive style, also referring to the electro-industrial genre.²⁶

²⁶ Highlights from performances can be found on the project's Twitch account. See "Videos," *ElectoElectro*, Twitch videos, January 31, 2021, <https://www.twitch.tv/electoelectro/videos>.

The riots that occurred at the United States Capitol Building on January 6, 2021 have led to another update of the project. This iteration is a work-in-progress and has the working title of *Shelter in Place*. This new group of compositions samples videos from the speeches President Trump recorded and posted in the final days of his presidency. The percussive sounds will follow the forceful style of *Bunker Edition* and will be comprised of videos of the rioters smashing windows and breaking down doors. The iPad and projector configuration will look similar to *Bunker Edition*, but everything will be moved to the floor, forcing me to kneel in order to play the iPads.

Conclusion

Clearly the ultimate format of the piece was an unexpected departure from the initial plan which called for in-person interaction and cooperation between stations and multiple participants. The performance aspect of the current iteration also changed the role of the audience from potential collaborators to a more passive, watchful role. The project's physically inaccessible format became an interesting parallel to what was happening in New Jersey and in other states. In New Jersey, mail-in ballots became the norm when Governor Phil Murphy issued a statewide mandate on mail-in voting. On Election Day 2020, New Jersey polling locations limited voting booth access, opting instead to collect paper ballots.²⁷ Physical voting booths were available only to people with disabilities who wished to vote in-person.²⁸

The network that existed between the stations was meant to encourage a collaboration and a shift in thinking on the part of the participant. One of my goals was to get people who visit and play with the station to think about voting as a collaborative effort, rather than a solitary activity. This sense of community can be felt at campaign events and when the numbers are tallied on the news on the night of Election Day; I had hoped to help foster a sense of collaboration that could be felt immediately at the voting booth through networked collaborative music. In my previous essay, "Interactive Art Installations: The Diebold AccuVote-TS in Context," I wrote about how networked music performance could run parallel with a public art agenda. From the essay:

There is something alongside the bits and signals running through the wires between performers; there is also synchronicity and a common goal, a shared creative output. . . . A simple ethernet cable . . . can have the ability to transform a group of solitary stations into [a] small ensemble. . . . [A] participant hopefully considers how his or her contribution is a small part within a larger orchestration, symbolic of how a single voter is a small

²⁷ Office of the Governor, "Governor Murphy Signs Executive Order to Protect Public Health by Mailing Every Active Registered Voter a VBM Ballot Ahead of the General Election," State of New Jersey, August 14, 2020, <https://www.nj.gov/governor/news/news/562020/20200814b.shtml>.

²⁸ Catalini, Mike, "Another New Pandemic Reality? Election Gets Shaken Up," Associated Press, September 5, 2020, <https://apnews.com/article/3d46d43880d45d88f4fc8403480dcaf8>.

contributor to the democratic process. This process is often a chaotic, and an unpleasant one, especially considering the current times. In the end, however, when all the votes fall into place, the process is orchestrated.²⁹

Safely achieving this level of cooperation is very difficult due to the pandemic. This missed opportunity is probably one of the most disappointing aspects of the new format. It is rather ironic, however, that keeping real voting booths connected to a network through a modem actually constitutes a security flaw, whereas connecting the stations of *Electo Electro* created a collaborative environment. This would be through a network with stations in different locations, perhaps across the country or world. Another goal would be to look into building a browser-based interface or mobile app. Time constraints prevented both approaches, but perhaps future iterations would allow for one, the other, or both implementations. I would also like to continue to make improvements to the current patch and update the content to keep pace with ongoing voting issues in current events.

In summary, the *Electo Electro 2020* project needed to adapt to a new set of circumstances and constraints. The shift in format and concept did allow for new possibilities as the most recent iterations placed the project squarely within the realm of networked music, a rather exciting prospect. The project aimed to provide a more interactive way of experiencing political soundbites and video. The existing political landscape in the United States is an antagonistic one, requiring a daily exercise of awareness, caution, and watchfulness. Hopefully, the audience has been encouraged to start and continue conversations about voting and the fragility embedded in the democratic practice of choosing leadership at all levels of government.

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²⁹ Mike Richison, "Voting Booths and Interactive Art Installations: The Diebold AccuVote TS in Context," *Journal of Network Music and Arts* 1, no. 1 (2019), <https://commons.library.stonybrook.edu/jonma/vol1/iss1/>.

Appendix

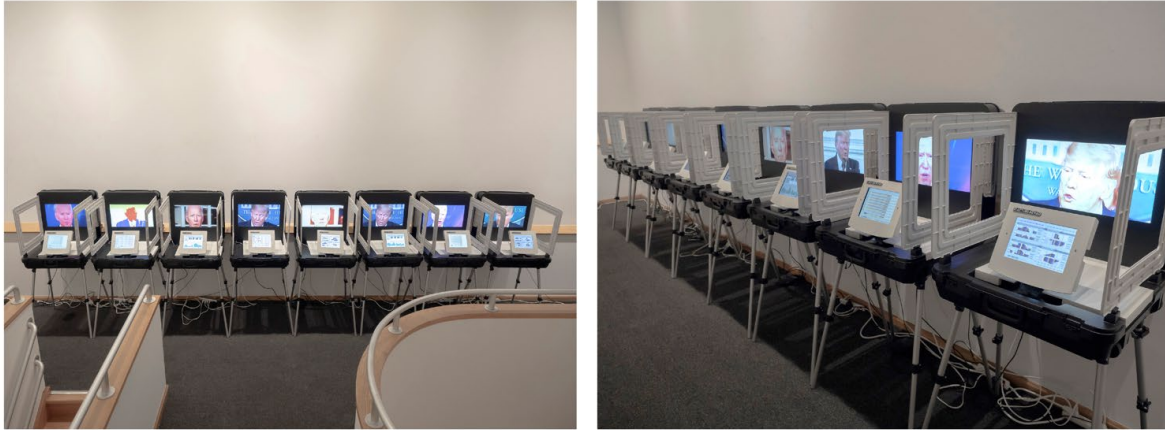


Figure 1: Installation view of *Electo Electro 2020* at the Ice House Gallery, Monmouth University, 2020. Diebold AccuVote voting booths, iMacs, iPads, custom software, dimensions variable. All 2020 installation photos and screenshots by author.



Figure 2: Installation view of *Electo Electro 2020* at the Ice House Gallery, Monmouth University, 2020. Diebold AccuVote voting booths, iMacs, iPads, custom software, dimensions variable.



Figure 3: Installation view of *Electo Electro 2020* at the Ice House Gallery, Monmouth University, 2020. Diebold AccuVote voting booths, iMacs, iPads, custom software, dimensions variable.



Figure 4: Screenshot of *Electo Electro 2020* performance 2020 at the Ice House Gallery, Monmouth University, October 2020.



Figure 5: Screenshot of *Electo Electro: Bunker Edition* performance at the Ice House Gallery, Monmouth University, December 2020.



Figure 6: Diebold AccuVote-TS machine. Image by J. Alex Halderman, originally published in Ariel J. Feldman, Alex Halderman, and Edward W. Felten, “Security Analysis of the Diebold AccuVote-TS Voting Machine,” 2006.



Figure 7: *Video Voto Matic*, 2016. Vintage voting booth, iMac, 3D printing, custom software, dimensions variable. Installation at Monmouth University. Photos by Ty Poland.



Figure 8: *VideoVotoMatic*, 2016. Vintage voting booth, iMac, 3D printing, custom software, dimensions variable. Installation at *Art in Odd Places*, New York City, 2016. Photos by author.

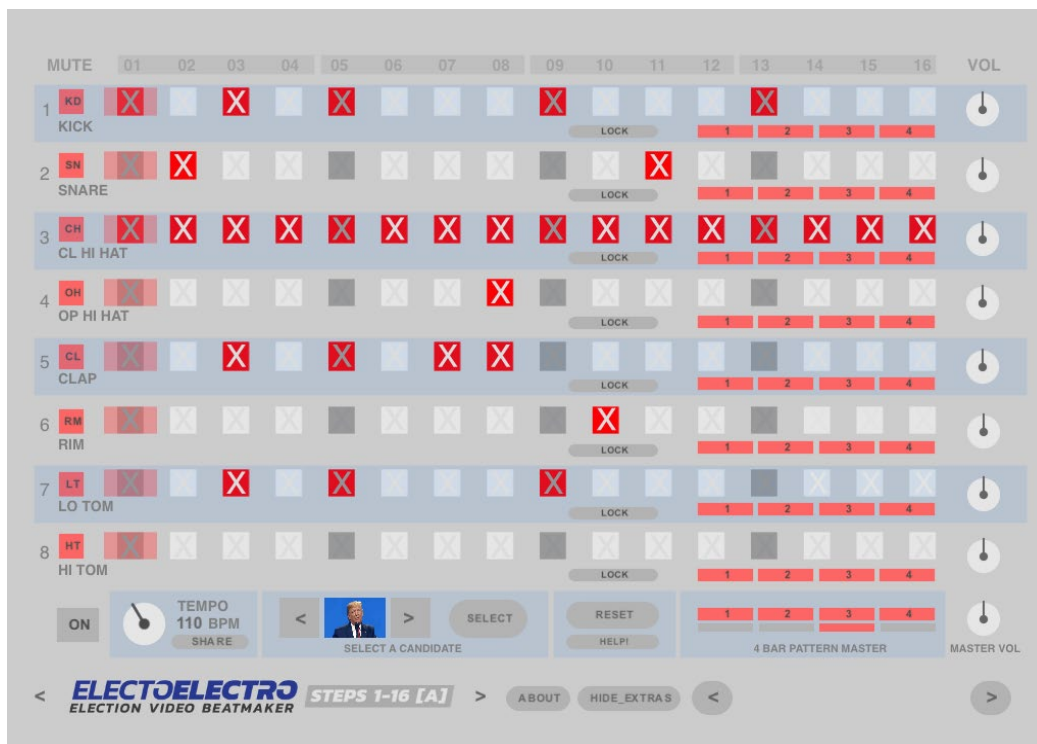


Figure 9: iPad panel 1: Steps 1-16

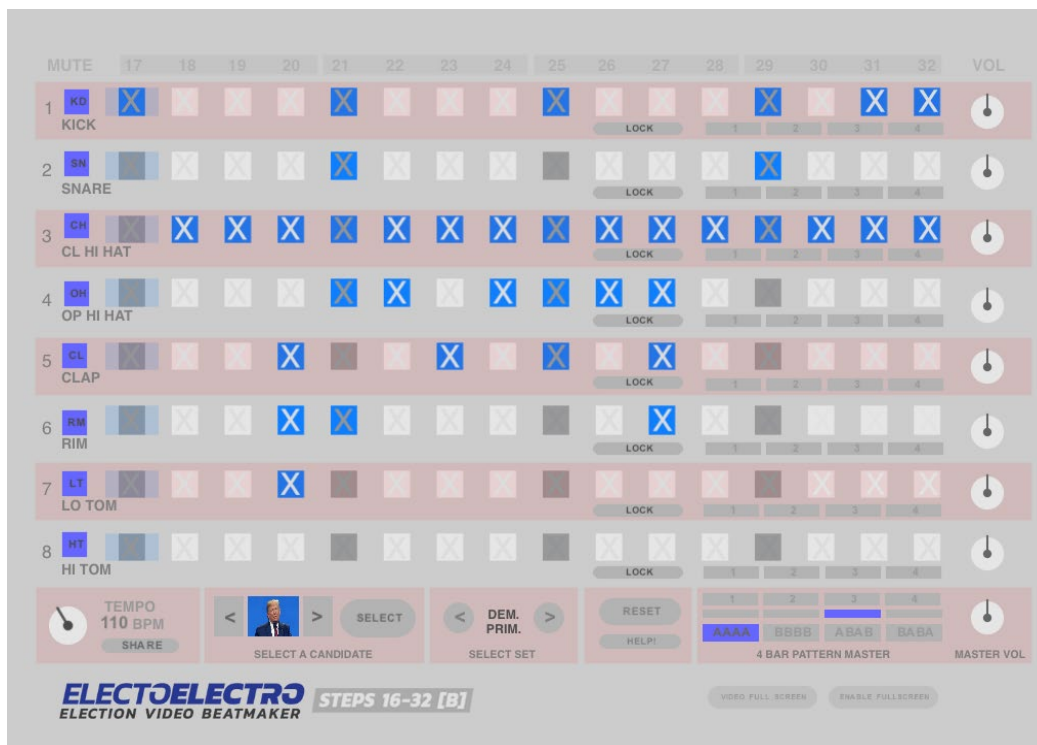


Figure 10: iPad panel 2: Steps 16-32

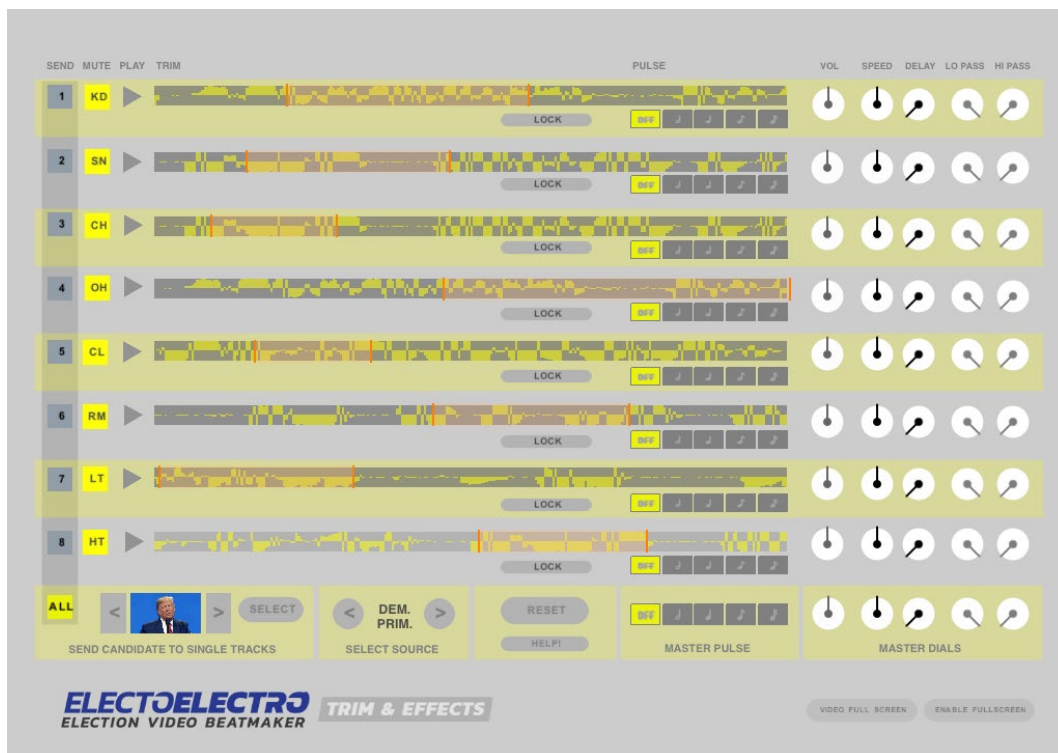


Figure 11: iPad panel 3: Clip trimming and effects

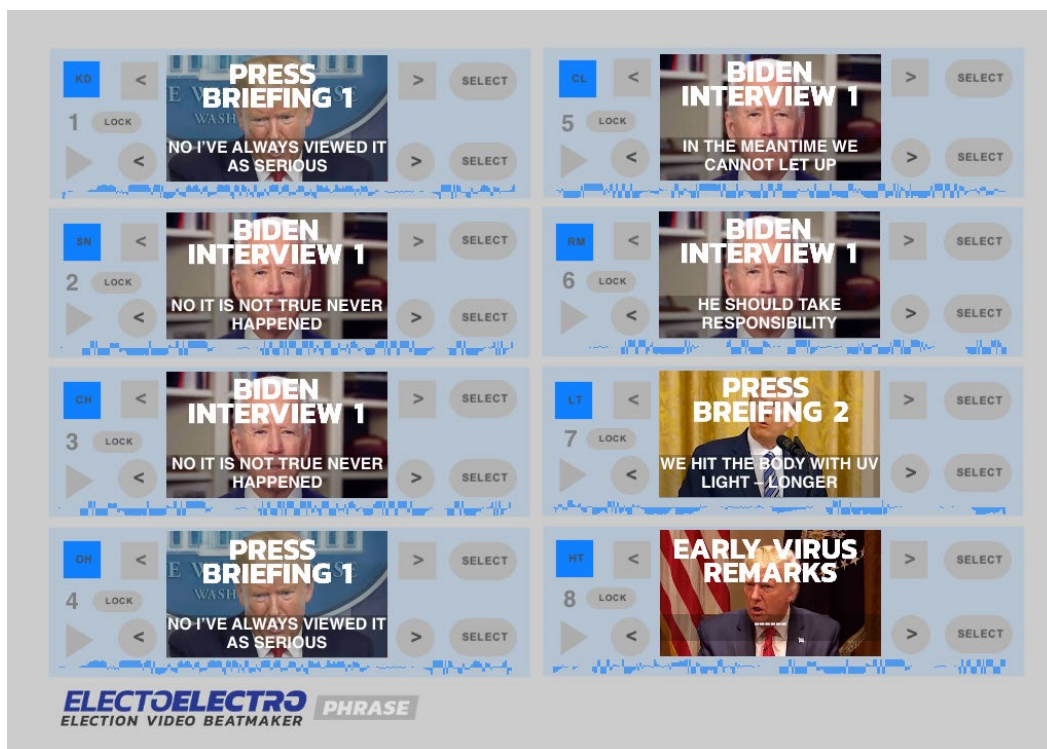


Figure 12: iPad panel 4: Selection of phrases

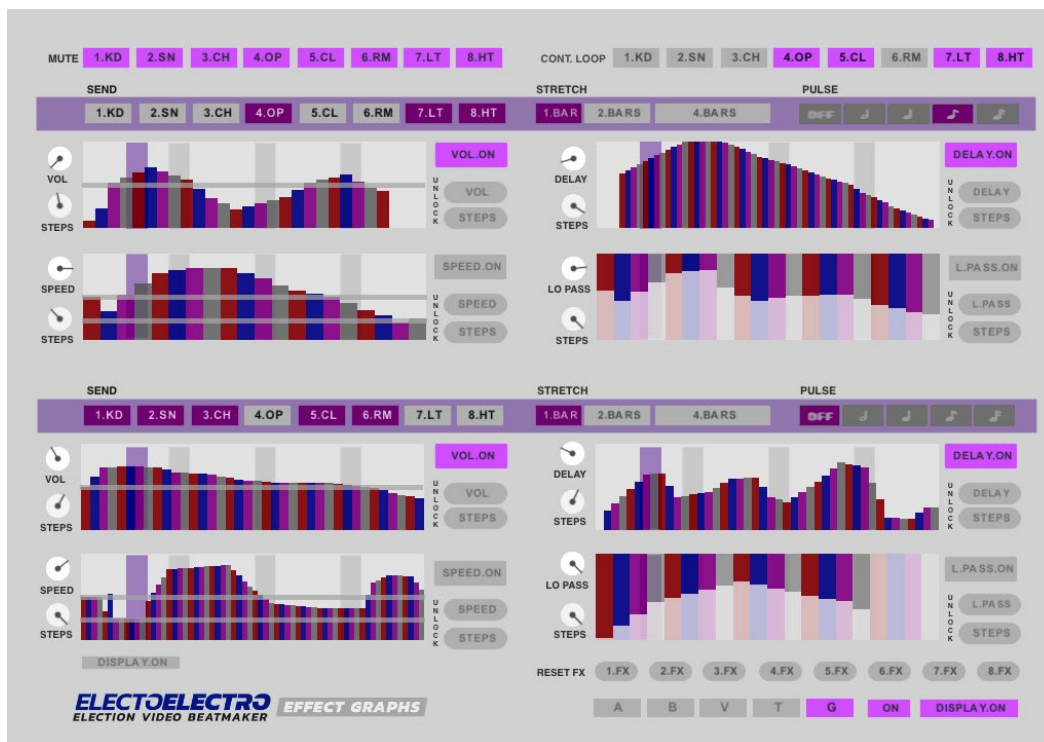


Figure 13: iPad panel 5: Effect Graphs

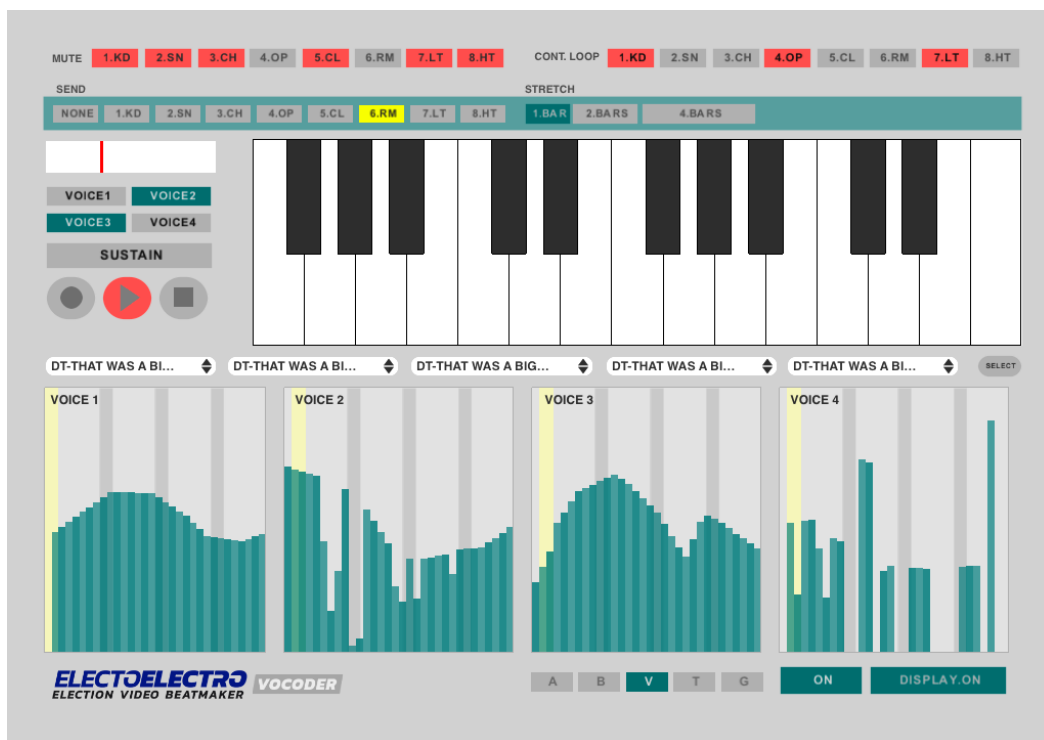


Figure 14: iPad panel 6: Vocoder

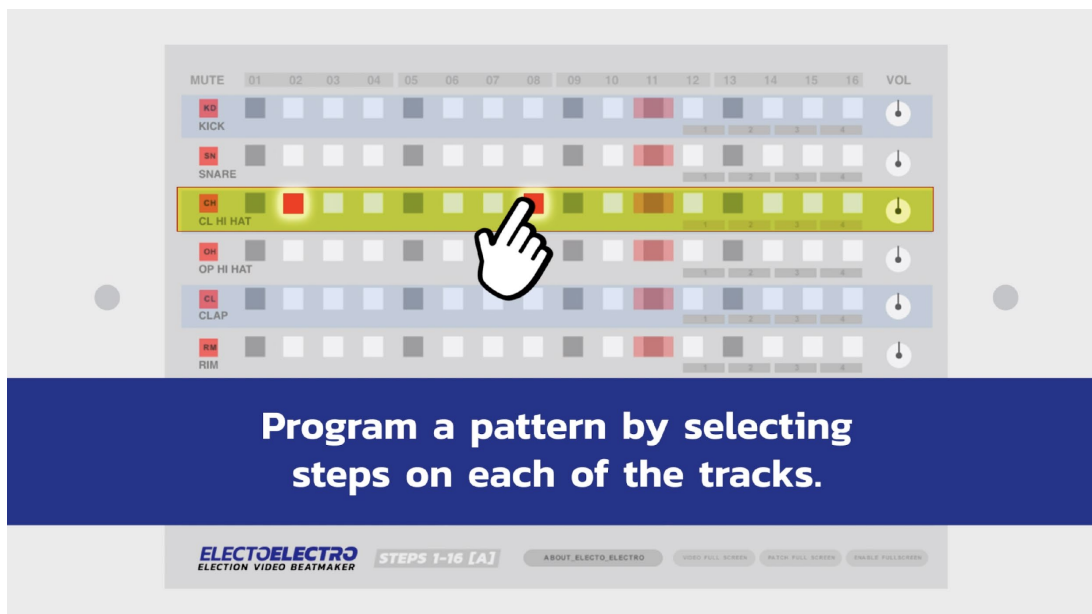


Figure 15: Screenshots of “Help” video

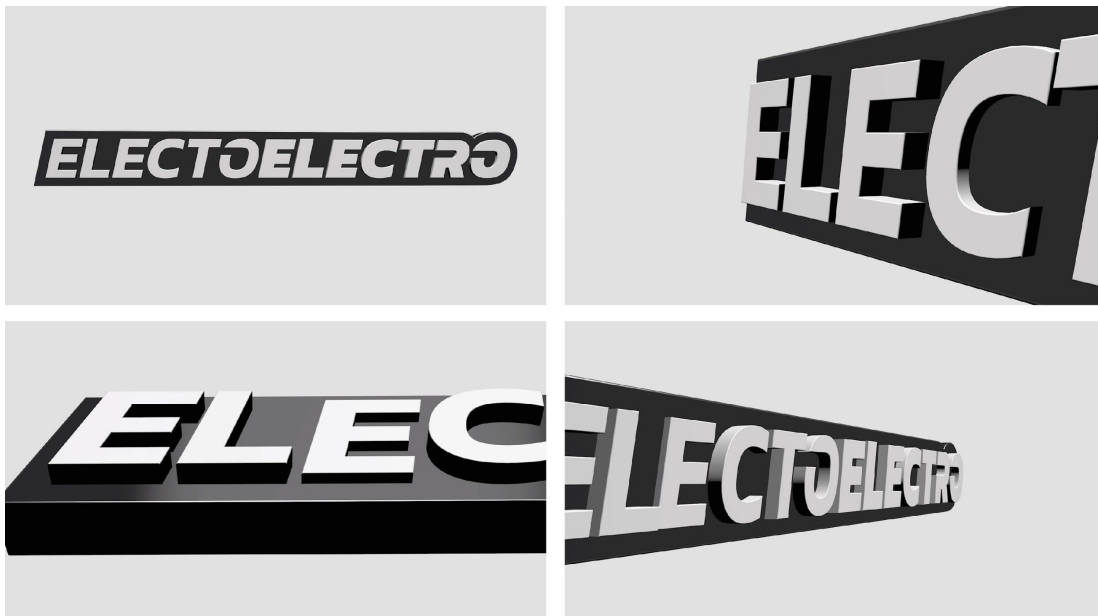


Figure 16: Screenshots of logo and motion graphics



Figure 17: Logos for *Blade Runner* and production company Orion Pictures

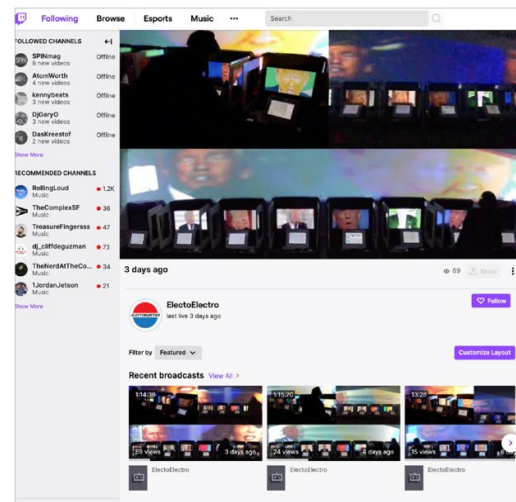
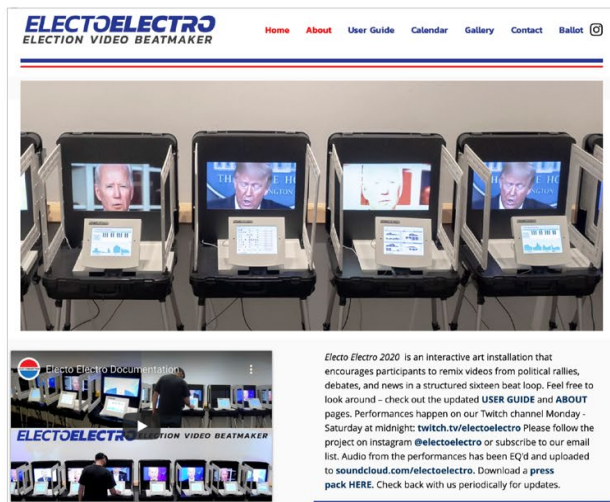


Figure 18: Screenshots of *Electo Electro* website and Twitch channel

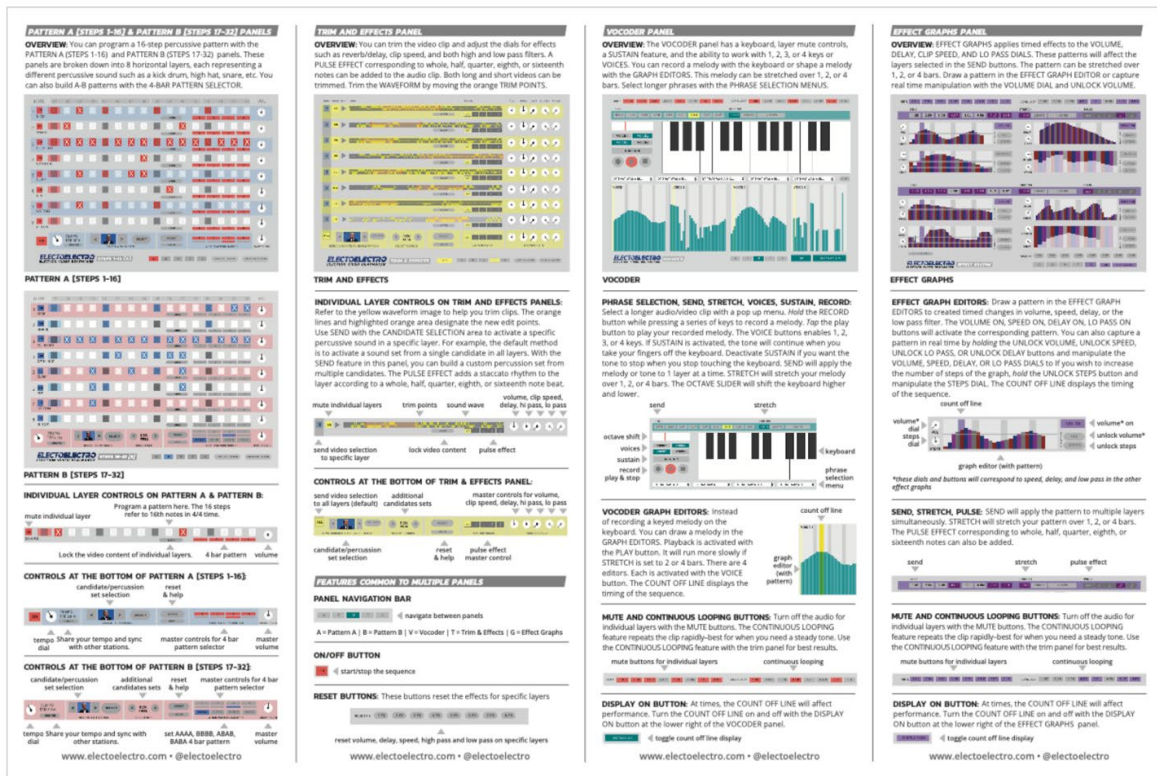


Figure 19: Electro Electro 2020 user manual, PDF

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